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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,318	04/01/2004	Jeffrey A. Amelse	37,370	9121

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BP America Inc.
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4101 Winfield Road
Warrenville, IL 60555

EXAMINER

BOYER, RANDY

ART UNIT	PAPER NUMBER
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1764

MAIL DATE	DELIVERY MODE
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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/816,318

Applicant(s)

AMELSE, JEFFREY A.

Examiner

Randy Boyer

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-21 is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-18 and 22-24 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>6 February 2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112 / 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 22-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claims 22-24 provide for the use of "an ammonia absorption refrigeration process," but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process Applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Likewise, claims 22-24 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-4, and 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Weedman (US 3067270).

7. With respect to claim 1, Weedman discloses a crystallization process for recovering paraxylene from a substantially hydrocarbon feedstock comprising cooling the hydrocarbon feedstock in at least one refrigerated crystallization stage that is indirectly refrigerated by evaporating at least a portion of a substantially liquid stream comprising ammonia (see Weedman, column 1, lines 66-72; and column 3, lines 30-34).

8. With respect to claim 2, Weedman discloses wherein the substantially hydrocarbon feedstock comprises hydrocarbons consisting essentially of ethylbenzene, paraxylene, metaxylene, orthoxylene, and hydrocarbon impurities (see Weedman, column 1, lines 70-72).

9. With respect to claims 3 and 4, Weedman discloses wherein the substantially hydrocarbon feedstock comprises a low paraxylene concentration of less than about 30 weight percent paraxylene (see Weedman, column 2, lines 17-32).

10. With respect to claim 10, Weedman discloses wherein the indirect refrigeration comprises vaporizing a substantially liquid stream comprising ammonia by transfer of

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heat from the substantially hydrocarbon feedstock to the substantially liquid stream comprising ammonia (see Weedman, column 3, lines 30-33).

11. With respect to claim 11, Weedman discloses wherein the indirect refrigeration further comprises the substantially liquid stream comprising ammonia not in direct contact with the substantially hydrocarbon feedstock (see Weedman, column 3, lines 30-33; and drawing).

12. With respect to claim 12, Weedman discloses wherein the indirect refrigeration further comprises the substantially liquid stream comprising ammonia and the substantially hydrocarbon feedstock located on opposite sides of a heat transfer surface (see Weedman, column 3, lines 30-33; and drawing).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. Claims 5, 6, and 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hubbell (US 5811629).

16. With respect to claim 5, Hubbell discloses a crystallization process for recovering paraxylene from a substantially hydrocarbon feedstock in at least one refrigerated crystallization stage that is indirectly refrigerated by evaporating at least a portion of a substantially liquid stream (see Hubbell, Abstract; and column 7, lines 17-64); wherein the substantially hydrocarbon feedstock comprises a paraxylene concentration of at least about 50 weight percent paraxylene (see Hubbell, column 12, lines 50-54).

Hubbell does not disclose wherein the substantially liquid stream comprises ammonia.

However, ammonia is known in the art to be an effective refrigerant for use in the crystallization of a hydrocarbon feedstock to recover paraxylene (see e.g., Weedman at column 3, lines 30-33).

Therefore, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to use ammonia as the refrigerant in Hubbell's crystallization process.

17. With respect to claim 6, Hubbell discloses wherein the substantially hydrocarbon feedstock comprises a high paraxylene concentration of at least about 70 weight percent paraxylene (see Hubbell, column 12, lines 50-54).

18. Claims 7, 8, and 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weedman (US 3067270).

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19. With respect to claim 7, Weedman discloses a crystallization process for recovering paraxylene from a substantially hydrocarbon feedstock comprising cooling the hydrocarbon feedstock in at least one refrigerated crystallization stage that is indirectly refrigerated by evaporating at least a portion of a substantially liquid stream comprising ammonia (see Weedman, column 1, lines 66-72; and column 3, lines 30-34); wherein at least one crystallization stage is cooled by heat exchange with an ethylene refrigerant (see Weedman, column 3, lines 13-15).

Weedman does not disclose wherein the ethylene refrigerant has been cooled with a stream comprising ammonia.

However, heat transfer and heat exchange between process streams is well known in the chemical engineering arts and well within the competence of the person having ordinary skill in the art (see e.g., H. Singh and F. Castillo, *Process Life Cycle Solutions for the Case of Automated Heat Exchanger Network Retrofit*, 22 APP. THERM. ENG. 949-958 (2002)).

Therefore, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to modify the process of Weedman to provide for cooling of the ethylene refrigerant via the interprocess heat exchange between the ethylene and ammonia streams, e.g. in order to make the process more economical in terms of energy consumption.

20. With respect to claim 8, Weedman discloses wherein the at least one crystallization stage removes from the hydrocarbon feedstock a stream of at least 69 weight percent paraxylene (see Weedman, column 4, lines 20-23).

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21. With respect to claim 13, Weedman discloses a crystallization process for recovering paraxylene from a substantially hydrocarbon feedstock comprising cooling the hydrocarbon feedstock in at least one crystallization stage cooled by an ethylene refrigerant.

Weedman does not disclose wherein the ethylene refrigerant has been cooled by heat exchange with a substantially liquid stream comprising ammonia.

However, heat transfer and heat exchange between process streams is well known in the chemical engineering arts and well within the competence of the person having ordinary skill in the art (see e.g., H. Singh and F. Castillo, *Process Life Cycle Solutions for the Case of Automated Heat Exchanger Network Retrofit*, 22 APP. THERM. ENG. 949-958 (2002)).

Therefore, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to modify the process of Weedman to provide for cooling of the ethylene refrigerant via the interprocess heat exchange between the ethylene and ammonia streams, e.g. in order to make the process more economical in terms of energy consumption.

22. With respect to claim 14, Weedman discloses wherein the substantially hydrocarbon feedstock comprises hydrocarbons consisting essentially of ethylbenzene, paraxylene, metaxylene, orthoxylene, and hydrocarbon impurities (see Weedman, column 1, lines 70-72).

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23. With respect to claims 15 and 16, Weedman discloses wherein the substantially hydrocarbon feedstock comprises a low paraxylene concentration of less than about 30 weight percent paraxylene (see Weedman, column 2, lines 17-32).

24. With respect to claim 17, Weedman discloses wherein the at least one crystallization stage removes from the hydrocarbon feedstock a stream of at least 69 weight percent paraxylene (see Weedman, column 4, lines 20-23).

25. With respect to claim 18, Weedman discloses wherein the stream is slurried at least once and melted to produce a final paraxylene product (see Weedman, column 3, lines 7-29).

Allowable Subject Matter

26. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

27. Claims 19-21 are allowed.

28. Claims 22-24 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office Action.

29. The following is Examiner's statement of reasons for allowance:

With respect to claim 9, none of the prior art of record or that specifically relied on in this Office Action discloses or suggests wherein the crystallization stage is refrigerated by: (a) evaporating at least a portion of the substantially liquid stream comprising ammonia from enthalpy supplied by a heat source from the crystallization

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process, and (b) absorbing the evaporated ammonia from step (a) into a stream comprising a mixture enriched in water relative to ammonia.

With respect to independent claim 19 (from which claims 20 and 21 depend), none of the prior art of record or that specifically relied on in this Office Action discloses or suggests a crystallization process for recovering paraxylene from a substantially hydrocarbon feedstock comprising cooling the hydrocarbon feedstock in at least one refrigerated crystallization stage that is indirectly refrigerated by cooling substeps: (a) contacting a stream comprising ammonia vapor with a stream comprising water and forming a liquid mixture comprising water and ammonia; (b) recovering from the liquid mixture comprising water and ammonia a substantially liquid stream comprising ammonia; and (c) vaporizing at least a portion of the substantially liquid stream comprising ammonia by transferring at least a portion of the enthalpy of vaporization to the substantially liquid stream comprising ammonia from the hydrocarbon feedstock.

With respect to independent claim 22 (from which claims 23 and 24 depend), none of the prior art of record or that specifically relied on in this Office Action discloses or suggests an ammonia absorption refrigeration process comprising at least one enthalpy source selected from the group consisting of: condensing overhead vapors of distillation towers used to separate products, byproducts, and/or recycle streams of a crystallization process to recover paraxylene; reactor effluent streams of a crystallization process to recover paraxylene; furnace flue gas of a crystallization process to recover paraxylene; steam generated during a crystallization process to recover paraxylene;

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and warm streams on other chemical or refinery units located near a paraxylene crystallization process unit.


Conclusion

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Randy Boyer whose telephone number is (571) 272-7113. The examiner can normally be reached Monday through Friday from 8:00 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola, can be reached at (571) 272-1444. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RPB


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